together in fleets, and remained out on the grounds for weeks at a time, steam was introduced, and the east-side of the North Sea visited. It was a "roaring trade," and many were made wealthy by it. Now things are changed, and every one cries out that the balance has been overturned, that the fish are being caught faster than the stock is being kept up: this, in spite of what was once said as to the amount of fish which could be taken from one acre of sea-bottom. It is possible to fix close times during which salmon and trout must not be taken from certain rivers, and to hatch fry which will remain in the one district. It is another matter to apply close seasons, or fix standard sizes for areas of the open sea. From what we know of life at the sea-bottom it is pretty certain that if one of the conditions necessary for keeping up a true balance of nature is removed or greatly lessened, the proportional arrangement of the remaining fauna is also interfered with, for since marine animals prey largely upon each other it follows that if one class of devourers is removed, the devoured become more numerous, which again seriously affects other classes.

For this reason an over-fished oyster or mussel bed if left to itself, or not properly regulated, will probably never regain its former condition, a fact brought out with great clearness in the course of the evidence taken before Lord Balfour of Burleigh, at the Board of Trade Conference last June. With free swimming round fish the condition is somewhat analogous, although more knowledge is required concerning their migratory movements. If the natural balance is interfered with, the result, although at first it may be only to increase certain other forms which are also of advantage to man, will eventually appear when useless or unprofitable fishes remain in the majority, or when the appearance of a once common and useful species is no longer present in the market.

If human interference can so alter the marketable productivity of the sea, and materially lessen the incomes of a large portion of a nation, surely it becomes a duty to study the application of such sciences as deal directly with the animals concerned. If by continual fishing the only available grounds became depleted, it is by a thorough study of the actual cause and effect, and the application of the principles of natural history involved, that the only true remedy is to be found.

W. L. CALDERWOOD.

THE SOUTH KENSINGTON LABORATORIES AND RAILWAY.

THE friends of science throughout the country may be congratulated upon the fact that work in the laboratories of the Royal College of Science and of the City and Guilds Institute is not to be rendered impossible by the building of a railway along Exhibition Road. Sir John Kennaway, the chairman, and the members of the House of Commons Committee deserve the best thanks of the community for their unanimous rejection of the scheme even if only partly on scientific grounds. When the evidence given before the committee comes to be published there will be some curious reading. Lord Kelvin, the President of the Royal Society, informed the committee of what was at stake, and gave his opinion as to the question both of mechanical and electrical disturbance. The paid "scientific experts" in their pleading on the side of the company promoters may be said to have almost eclipsed the usual "emphasis" of statement. We may refer to this evidence later, but in the meantime the following quotation from a leader in the *Times* indicates the general opinion as to the importance of the result which has been achieved:—

"What makes the history of this Bill novel and interesting is the second line of attack adopted by its opponents. On either side of Exhibition Road stand two of the most important scientific institutions in London. One of these—the Royal College of Science—is supported by the State; the other was founded by the City and Guilds of London for the promotion of advanced technical education. The former of these institutions, and the great collection of scientific instruments which is being formed at South Kensington, make an organised whole. This collection, which includes the earlier and the latest instruments, is invaluable both historically and practically; and is in close proximity to the lecture-halls and laboratories where use can be made of the instruments. The collection and the laboratories are used not only by many other students, but by the large number of national scholars and exhibitioners who, after the annual May examination of the Science and Art Department, are brought up from all parts of the country, chiefly at the public expense. These students, and the deserving lads who work at the City and Guilds Institute, form an important element in the situation; for to them the advent of an electrical railway was a serious peril. It was shown, and admitted, that the magnetic disturbances in the neighbourhood of the South London Railway are so great that no accurate magnetic work can be done within some hundreds of yards of it. Now the proposed Paddington and Clapham Railway would run, not some hundreds of yards from the South Kensington laboratories, but within forty feet of some of them; and there was a genuine fear on the part of the Professors that at such small distances it would be impossible not only to accurately neutralise the conflicting forces, but to prevent the astronomical instruments being affected by the earth-tremors caused by the passage of trains. This view was urged by Lord Kelvin, perhaps the greatest living authority on such matters, and by Profs. Norman Lockyer, Ayrton, Rücker, and Boys; and after a contest which lasted three days their view prevailed, and the committee found the preamble of the Bill 'Not proved.' The men of science are to be congratulated on the result. A year or more ago they successfully defended their South Kensington preserve against the invasion of Art; and it would be pitiful indeed if Science were now to be put in jeopardy by a practical application of herself. It appears that electricity cannot be studied in the neighbourhood of an electric railway; naturally, then, we cannot have an electric railway close to the great central institution where electrical science is taught at the public expense."

NOTES.

THE annual general meeting of the Institution of Naval Architects is being held this week in the rooms of the Society of Arts, which have been lent for the purpose. The proceedings began yesterday (Wednesday) morning, and will conclude to-morrow evening. The meeting is one of more than usual importance in the history of the Institution from the fact that the president, the Earl of Ravensworth, is resigning the position which he has so well filled for a period of fourteen years Lord Ravensworth is the second president the Institution has had, he having succeeded to the chair on the death of Lord Hampton, who first occupied the position. The new president is Lord Brassey, whose great interest in all maritime questions well qualifies him for the post. Lord Ravensworth will not sever his connection with the Institution, as he will accept the position of a vice-president. The following is the programme of the present meeting:—Wednesday, March 22.—Morning meeting, at twelve o'clock: Annual report of Council; address by the president (the Earl of Ravensworth); on the present position of the cruiser in warfare, by Rear-Admiral S. Long; on approximate curves of stability, by W. Hök. Thursday, March 23.—Morning meeting, at twelve o'clock: Some considerations relating to the strength of bulkheads, by Dr. F. Elgar; on the measurement of wake currents, by George A. Calvert; on the new Afonasieff's formulæ for solving approximately various problems connected with the propulsion of ships, by Captain E. E. Goulaeff. Evening meeting, at seven o'clock: Some experiments on the transmission of heat through tube-plates, by A. J. Durston; some notes on the testing of boilers, by J. T. Milton. Friday, March 24.—Morning meeting, at twelve o'clock: On an apparatus for measuring and registering the vibrations of steamers, by Herr E. Otto Schlick; on the repairs of injuries to the hulls of vessels by collisions, stranding, and explosions, by Captain J. Kiddle. Evening meeting, at seven o'clock: Some experiments with the engines of the s.s. *Iveagh*, by John Inglis; on the cyclogram, or clock-face diagram, of the sequence of pressures in multi-cylinder engines, by F. Edwards; presentation of an address from the Institution to the Right Hon. the Earl of Ravensworth, on his retirement from the office of president. In addition to the above there is a paper by Lord Brassey on merchant ships as cruisers. The annual dinner was held at the Holborn Restaurant yesterday evening. In summer the Institution will meet at Cardiff.

ON Friday a deputation will wait upon Mr. Campbell Bannerman to make some representations as to the position of those Woolwich cadets who have taken up science at the entrance examination. The existing system at the Royal Military Academy, as we have repeatedly taken occasion to point out, is very unfavourable to cadets of the scientific type, and it is hoped that the approaching interview may lead to the adoption of more reasonable methods. Among the members of the deputation will be Sir Henry Roscoe, Sir Henry Howorth, and the head masters of Rugby, Cheltenham, and Clifton.

MR. W. L. CALDERWOOD has resigned the post of director of the Laboratory of the Marine Biological Association at Plymouth. He vacates the residence early in April.

WE are privately informed of the death, on the 7th instant, of Dr. G. Vasey, the chief of the botanical section of the United States Department of Agriculture at Washington. He was a native of Yorkshire, we believe, and emigrated to America many years ago. The grasses of North America were his special study, and he published several important works on this family. The "Grasses of the Pacific Slope" and the "Grasses of the South-west," fully illustrated, are his latest works; but the former is not yet completed. Dr. Vasey wrote also on the agricultural value of the grasses of the United States. Last year he visited England, and made many friends through his amiable disposition.

WE learn with regret, from the daily papers, that the Rev. W. Woolls, of Burwood, near Sydney, New South Wales, has lately died. It is stated that he emigrated from England as long ago as 1831, and he certainly did much to promote science in the country of his adoption. Botany was his favourite study, and he made several important contributions to botanical literature, chiefly on the botany of New South Wales. He was president of the "Cumberland Mutual Improvement Society," and in that capacity delivered a number of carefully compiled instructive lectures on the vegetable products and resources of the colony, and other branches of botany. One of the most interesting of his published lectures is on the progress of botanical discovery in Australia, which is indeed a concise and correct history of the subject. It was he who wrote the appreciative reviews of the volumes of Bentham's "Flora Australiensis" that appeared in the *Sydney Morning Herald*, and he himself published separate accounts of the plants of the neighbourhood of Sydney, of the Paramatta district, and of the colony of New South Wales.

THE *Botanisches Centralblatt* announces the death of Dr. Karl Prantl, Professor of Botany in the University of Breslau, and director of the Botanic Garden there. For some years past Dr. Prantl has edited *Hedwigia*, a journal devoted to cryptogamic botany; but it was chiefly as a teacher that he was known. An English edition of his "Lehrbuch der Botanik" was edited by Dr. S. H. Vines in 1880.

THE following are among the lecture arrangements at the Royal Institution after Easter:—Mr. John Macdonell, three lectures on symbolism in ceremonies, customs, and art; Prof. Dewar, five lectures on the atmosphere; Mr. R. Bowdler Sharpe, four lectures on the geographical distribution of birds; Mr. James Swinburne, three lectures on some applications of electricity to chemistry (the Tyndall lectures). The Friday evening meetings will be resumed on April 14, when a discourse will be given by Sir William H. Flower, on seals; succeeding discourses will probably be given by Prof. A. B. W. Kennedy, Prof. Francis Gotch, Mr. Shelford Bidwell, the Right Hon. Lord Kelvin, Mr. Alfred Austin, Mr. Beerbohm Tree, Prof. Osborne Reynolds, Prof. T. E. Thorpe, and other gentlemen.

DR. H. WOODWARD, F.R.S., is the president of the Malacological Society which was founded lately at a meeting held at 67, Chancery Lane. The Society will meet at the same place on Friday, April 14, at 8 p.m., and again on the second Fridays in May and June, after which there will be no meeting till November.

ANY one who may desire to learn all that is best worth knowing about the progress and prospects of technical education should read an admirable lecture on the subject delivered by Sir Philip Magnus last week before the Society of Arts, and printed in the current number of the Society's Journal. Sir Philip is of opinion that what is now wanted is the co-ordination of our resources and the simplification of our machinery. The Technical Instruction Committees, with the help of their able secretaries, are doing good and useful work, although much of it is necessarily impeded by the restrictions of the Acts of Parliament under which they work. Between these bodies and the School Boards, Sir Philip urges, there should be earnest cooperation. To them, acting together, and strengthened by the representatives of other educational interests, should be ultimately submitted the duty of making that further provision for secondary education, the need of which is generally admitted.

A MEETING was held at the First Avenue Hotel on Saturday last for the purpose of forming a Cage-bird Club. Dr. Martin, chairman of the Norton Ornithological Society, and vice-president of the London Cage-bird Association, occupied the chair; and a paper was read by Mr. W. H. Betts, who explained that the object of the club was the enrolment among its members of ladies and gentlemen who, from the fact that the majority of cage-bird clubs were held at public-houses, were debarred from membership thereof. He said the club would endeavour to train novices in the management of cage-birds, would give encouragement and assistance to ornithological societies generally, would circulate literature with the object of improving the moral tone of the cage-bird fancy, and would endeavour to prevent cheating at shows and to put an end to brutality. On the motion of the Rev. W. K. Suart, president of the Cage-Bird Association, seconded by Mr. George Crabb, president of the London and Provincial Ornithological Society, it was determined that the club should be founded. Mr. Betts was appointed honorary treasurer, and Miss E. A. Darbyshire honorary secretary.

DR. JAMES RORIE, writing from Westgreen House, Dundee, sends us the following note on a brilliant meteor:—"A very brilliant meteor, or fire-ball, was seen here about 6.23 p.m. on Saturday evening, the 18th inst. When first observed it was about 70° above the horizon south-south-west from the asylum, and moving in a direction from east-south-east to west-north-west. It was visible for about five seconds, and appeared like a large pale blue ball of fire throwing off jets of red-coloured flames, and leaving behind it a pale white silvery streak, marking its course across the sky like a very thin line of vapour, but at the point near the horizon where the meteor disappeared leaving a shining electric blue colour. This streak was in all probability composed of dust particles thrown off by the meteor during the passage in a state of ignition through the atmosphere, as it remained visible for nearly three-quarters of an hour, first as a straight line, and then, evidently caught by the westerly wind, becoming gradually contorted, and, slowly expanding and disappearing, it passed overhead like a long thin twisted cloud of pale blue smoke."

During the latter part of last week the high pressure over France gave way, and several shallow secondary depressions passed across our islands, accompanied by northwesterly winds, snow and hail showers. Sharp frosts occurred in places at night, the shade minima varying from 20° to 23°, while the grass temperatures were much lower, the thermometer on Saturday night falling as low as 12° to 16° in the Midland counties and in London; but during the bright intervals of the day-time the maxima reached 50° and upwards. Towards the close of the week an anti-cyclone which previously lay off our south-west coasts spread over the United Kingdom, and extended eastwards over the continent. The weather during the next few days became fine and bright generally, with the exception of fog in the neighbourhood of London and the south-east of England. The maximum day temperatures exceeded 60° at several stations, but the nights continued exceptionally cold, the ground being thickly coated with hoar frost. Such severe frosts as those experienced on several nights during the past week rarely occur so late in the season. The *Weekly Weather Report* for the week ending the 18th instant shows that, notwithstanding the very low minimum temperatures, the averages for the week were rather above the mean in England and the south of Ireland. Rainfall was considerably in excess of the average in the north of Scotland, but less in all other parts. The greatest amount of bright sunshine was recorded in the north-east of England, where there was 52 per cent. of the possible amount; the lowest average amount was 18 per cent. in the north of Scotland.

With the view of enabling masters of vessels to know what weather to expect at sea in the far East, and to choose the best routes, all the observations recorded in the archives of the Hong Kong Observatory made between 0° and 45°, and between Singapore and 180° E. Gr. are being tabulated, and will serve for the construction of maps, which will ultimately make it possible to issue pilot charts for the China Seas. Dr. Doberck invites all persons having old log-books in their possession to send them to him on loan. There are log-books of our large lines which, if forwarded to the proper quarters, might help to make passages shorter, pleasanter, and safer.

The Societies forming the Scientific Alliance of New York have held their first joint meeting, the object being to present the needs of science in that city, and the plans and purposes of the Council of the Alliance. The addresses delivered on this occasion have now been published as a pamphlet. We may note that the membership of the societies is over 650, and is said to include the names of nearly all persons in New York who are interested in pure science.

Columbia College, New York, has received from Mr. Loubat an endowment which is to be used for the encouragement of the study of (1) The history, geography, and numismatics, (2) the archæology, ethnology, and philology of North America. It will permit an award at least every five years alternately in these two groups of subjects. This year two prizes of 1000 dollars and 400 dollars will be given for the best works published in English on the subjects in question. The author need not be a citizen of the United States. The works must have been published since January 1, 1888, and must be based on original research. Copies must be sent, not later than June 1 of the present year, to the president of Columbia College, whose secretary will furnish copies of the regulations adopted.

Mr. Thomas Steel, of Victoria, has been visiting several zoological gardens in Great Britain and America; and in the February number of the *Victorian Naturalist* he gives an interesting account of some of his experiences. In the London Zoological Gardens he was naturally attracted especially by animals and birds from Australia. The kangaroos seemed to him to have very small quarters compared with those set apart for kangaroos in the Melbourne gardens. Nevertheless, he thought them "fairly healthy and sleek." Mr. Steel was much pleased with a pair of Australian brush turkeys, who were evidently "quite at home in their enclosure." The laughing jackass, however, was the animal which interested him most strongly. He had "quite a thrill of pleasure" when he recognised its "well-remembered voice." Of the collection of animals in the Central Park, New York, Mr. Steel formed no very high opinion. He was much surprised that so mighty a city should be "so far behind in a matter of this kind." Of the "dejected-looking lions" in the Central Park he says that they were greatly to be pitied. They were "cooped up in the smallest of cages, with no proper shelter and no exercising yard."

The *Kew Bulletin*, appendix ii. 1893, consists of a list of the new garden plants of the year 1892. The list includes not only plants brought into cultivation for the first time during 1892, but the most noteworthy of those which have been reintroduced after being lost from cultivation. Other plants included in the list have been in gardens for several years, but either were not described or their names had not been authenticated until recently. These annual lists, as the *Bulletin* points out, are indispensable to the maintenance of a correct nomenclature, especially in the smaller botanical establishments in correspondence with Kew, which are, as a rule, only scantily provided with horticultural periodicals. The lists also afford information respecting new plants under cultivation at Kew, many of which will be distributed from the Royal Gardens in the regular course of exchange with other botanic establishments.

Prof. P. H. Schoute and some other Dutch mathematicians have undertaken to edit, under the auspices of the Mathematical Society of Amsterdam, a "Revue Semestrielle des Publications Mathematiques." The first part of the first volume has just been issued by W. Versluys, Amsterdam. The "Revue" appears likely to be of service to mathematicians far beyond the limits of Holland.

The Smithsonian Institution has published a collection of translations of some of the best recent memoirs issued in European countries on "The Mechanics of the Earth's Atmosphere." The work has been prepared by Mr. Cleveland Abbe, who expresses his conviction that "meteorology can be advanced beyond its present stage only by the devotion to it of the highest talent in mathematical and experimental physics.

The geological department of Colby University, U.S., has published a useful "Summary of Progress in Mineralogy and Petrography in 1892," by W. S. Bayley. The volume consists of monthly notes contributed to the *American Naturalist*.

Mr. Elliot Stock has issued a little volume, by "Medicus," showing how the height and chest measurement may be increased by systematic exercise. The title of the volume is "How to Improve the Physique."

In the current number of the *Comptes Rendus* there are two papers on the use of the electric current in producing high temperatures. In one MM. Moissan and Violle describe two forms of electric furnace which they have used in their experiments. The substance to be heated is contained in a small crucible made of carbon having two holes pierced through its side to allow the carbon rods, between which the arc is formed, to pass. This crucible is surrounded by blocks of lime to reduce the loss of heat on account of radiation. In one form of furnace there is an arrangement by which a piece of graphite, after being heated in the arc, is allowed to fall into a calorimeter, and by this means they have found that a temperature of 3000° can be reached. In the other paper MM. Lagrange and Hoho have investigated the fact, observed by Planté and others, that when you pass a sufficiently strong current through an electrolyte, using as negative electrode a fine wire, and as positive electrode a conductor of considerable surface, a kind of luminous sheath is formed round the negative electrode. The authors find that the heat developed in this sheath is very great, and that by its means a very intense heat can be applied at any point of a body while, on account of the rapidity with which the heat is disengaged, the rest of the body remains cold. As an application of this method they have heated to a bright red the outside of a bar of steel, while the inside remained comparatively cool, then by merely stopping the current the cold liquid has come in contact with the hot steel. In this way they have hardened the outside of bars of steel, while the inside has remained soft and therefore tough.

PROF. L. WEBER, of Kiel, has recently constructed a mercury barometer which can be filled without boiling, and whose vacuum can be freed from residual air at any time in a few seconds. It consists, according to the *Zeitschrift für Instrumentenkunde*, of a vertical tube with two bulbs, one on each side. One of these bulbs ends in a tube to which an indiarubber tube can be attached. The other is connected by a short tube with a capillary constriction. A narrow tube connects the lower end of the bulb with the top of the main tube, thus forming a kind of double barometer. To fill it mercury is poured into the first bulb and allowed to enter the main tube. In doing so it forces the air down through the narrow tube and out by the second bulb. Some mercury also enters the latter by the capillary constriction. On placing the instrument in a vertical position a vacuum is formed at the top of the two communicating tubes, which is slightly longer in the narrow one owing to capillary depression. Barometric readings are then taken in the usual way by means of a scale fixed to the main tube. The vacuum can be tested and easily restored in the following way: The indiarubber tube attached to the first bulb ends in an elastic ball with a small hole in it. This hole is closed by the thumb and the ball is compressed. Mercury is thus forced up the main tube and over into the capillary tube. If there is any residual air it will form a bubble between the two columns, which will on further compression be driven out through the second bulb. On releasing the pressure the vacuum is re-established, and the slight difference of level in the two bulbs is gradually obliterated by the passage of mercury through the capillary contraction. The latter can be replaced by a glass rod with a conically ground end, by means of which the communication between the two bulbs can be temporarily interrupted.

AN interesting communication concerning metallic osmium is contributed to the current number of the *Comptes Rendus* by MM. Joly and Vèzes. Metallic osmium, as usually prepared by the method of Berzelius, which consists in calcining the sulphide in a carbon crucible, takes the form of a powder or a spongy mass of a blue colour. As thus obtained it is rapidly attacked by the oxygen of the air with production of the volatile and dangerously poisonous tetroxide OsO_4; hence the metal constantly exhales a strong odour due to the vapour of the tetroxide. Sainte-Claire Deville and Debray some time ago succeeded in obtaining metallic osmium in the form of beautiful little greyish blue crystals, by passing the vapour of the tetroxide through a strongly heated carbon tube. The density of these crystals, 22·48, was the highest which has been observed for the metal. All the efforts, however, of Sainte-Claire Deville and Debray to fuse osmium in the flame of the oxyhydrogen blowpipe were unavailing. If enclosed in a crucible of carbon surrounded by another of lime, the metal simply remained unchanged, but if heated directly in the flame itself it rapidly disappeared, owing to its conversion into the volatile tetroxide, but no trace of fusion was ever observed. It is now shown that osmium does melt at the temperature of a very powerful electric arc, in a manner analogous to ruthenium. It is, of course, essential that special precautions should be taken in order to prevent loss of the extremely expensive metal by oxidation, and consequently volatility, particularly as the volatile product of the oxidation, the tetroxide, is so injurious to the experimenter. The operation was therefore performed in the electric furnace devised by Ducretet and Lejeune, which enabled the metal to be heated in a carbon crucible placed in a closed chamber traversed by a stream of carbon dioxide. Under these conditions when osmium is rapidly raised to the highest temperature of the electric arc it melts without sensible loss by volatilisation. After fusion osmium presents a very brilliant metallic surface of a beautiful blue colour slightly tinged with grey. It breaks with a crystalline fracture, and is distinguished by its remarkable hardness, being harder than both ruthenium and iridium, readily cutting glass and scratching quartz. Moreover, after fusion osmium appears to be no longer attacked by the atmospheric oxygen, its surface remaining bright greyish-blue.

THE whole of the refractory metals of the platinum family have now been obtained in the liquid form. Of them all osmium has been found the most refractory, its melting point being considerably higher than that of ruthenium. It resembles the latter metal very much in many of its properties, particularly as regards the ready formation of a volatile tetroxide. It differs entirely, however, from ruthenium in aspect, exhibiting as above described a remarkable blue metallic lustre, while ruthenium is more white than platinum, resembling in fact burnished silver. The six metals of the platinum group would appear to more particularly resemble each other in pairs, ruthenium and osmium having many physical and chemical attributes in common, rhodium and iridium being similarly very nearly allied, and palladium and platinum forming the third pair. In many respects, however, osmium exhibits a peculiar and somewhat isolated character, more akin to that of the metalloidal elements; indeed, so marked is this that Deville and Debray termed it the metalloid of the platinum group, Berzelius compared it to arsenic, and Dumas to tellurium.

NOTES from the Marine Biological Station, Plymouth:—Little change has been observed in the floating fauna since last week. *Sarsia prolifera* and medusæ of *Clytia Johnstoni* have again been taken; and *Obelia* medusæ have been plentiful, although for the most part very small and immature. A few *Polydora* larvæ have been taken. *Evadne Nordmanni*, which at times is abundant in the surface waters, has made its first appearance for the year; the few individuals noticed were carrying embryos in the brood pouch. The Nemertine *Cephalothrix lineare* and the crabs *Portunus depurator* and *holsatus* have begun to breed.

THE additions to the Zoological Society's Gardens during the past week include eleven Orbicular Horned Lizards (*Phrynosoma orbiculare*) from California, presented by Mr. William Chamberlain; a Stanley Parrakeet (*Platycercus icterotis*) from Australia, deposited; a wandering Albatross (*Diomedea exulans*) captured off Cape Horn, purchased; an Upland Goose (*Bernicla magellanica*) from the Falkland Islands, a Mute Swan (*Cygnus olor*) European, received in exchange; a Mouflon (*Ovis musimon*), four Shaw's Gerbilles (*Gerbillus shawi*), four Barbary Mice (*Mus barbarus*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE MELBOURNE OBSERVATORY.—On September 2 last Mr. Ellery, the Government Astronomer, made his annual report to the Board of Visitors to the Observatory. This report shows that with his staff a great amount of work was got through, the following being a brief summary:—With the meridian circle 3590 observations for Right Ascensions, and 2233 for N. P. D. were made, these numbers including the observations for the places of the guide stars used in the astrographic operations. The great telescope, owing to the demands on the staff for the astrographic work, has not been much in use, the routine work having been dropped altogether. It is pleasing to hear that a good start and considerable progress has been made in the part allotted to them in the photographic chart and catalogue of the heavens. Up to June 30, 278 plates had been exposed, excluding a great number obtained for purposes of testing adjustments, &c., although Mr. Ellery remarks that the weather since May was anything but inviting for such work. With the photoheliograph 201 sun pictures were obtained. The observations and records relating to terrestrial magnetism, meteorology, and intercolonial weather service, and time distribution have been continued as usual with satisfactory results. In the seventh paragraph of the report Mr. Ellery informs us of the necessity that has arisen for the reduction of expenditure. Mr. White, the chief assistant, and Mr. Moerlin, the second assistant, were both called upon to retire on September 30, having attained the age of sixty years, both a considerable loss to the observatory, having served there thirty-one and thirty years respectively, and Mr. Ellery found it necessary to close the observatory workshop, and dispense with the mechanic. In a re-organisation of the duties it will be necessary, he says, to put in abeyance observations with the great reflector, reduce meteorological work, including some photographic registration, stop ordinary extra-meridian observation, except the most important, reduce publications and issue of weather charts, and generally to limit operations to the most important and urgent kind. Such a reduction as this after so many years of smooth working and the loss of two such experienced and efficient officers must fall heavily on Mr. Ellery's shoulders, but we are glad to hear that the new scheme is now in working order. We hope to hear also that Mr. Wallace's services have been retained for the astrographic chart, as Mr. Ellery says in a supplementary report that without him this undertaking will have to be dropped.

NATAL OBSERVATORY.—Just as in his former report, Mr. Nevill, the Government Astronomer, is indebted to several ladies for assistance in the observatory, without whose aid he says the numerous astronomical and meteorological computations and reductions could not have been carried out (Report of the Government Astronomer for the year ending June 30, 1892). Again, he urges the necessity of removing the transit to another position, this instrument being so close to the equatorial that only one of them can be used at a time. Besides the usual observations for the comparison of the declinations deduced from observations made at observatories in both hemispheres, by a comparison (Talcott's method) of the zenith distances of northern stars and southern circumpolar stars, the work for determining the latitude of the observatory has been brought to a conclusion and awaits publication. The work, comparing the Greenwich lunar observations from 1851–1888 with the basis of Hansen's Lunar Tables, comprising a discussion of four thousand observations, has been completed, and auxiliary tables, founded on the corrections thus deduced, are now being formed. Several observations of Mars were made to determine the distance of the sun, and these are at present being reduced.

THE BIELIDS OF 1872, 1885, AND 1892.—In "Our Astronomical Column" on p. 451 we referred to a note by M. Bredichin on the Bielids, in which he said that from observations made last year it seemed very probable that the densest part of this swarm had undergone perturbations, amounting to a recession of the ascending node of nearly 4°, due to the proximity of the planet Jupiter. In the current number of *Astronomische Nachrichten*, 3156, he further suggests that the swarm has undergone a separation, perhaps into many parts, an analogous case of such a separation having occurred in the comet 1889 I. The force which accomplishes this division he denotes by I. at the commencement of separation and assumes that its direction coincides with the line of the radius vector, being positive and negative when directed towards and from the sun. Denoting by R the radius of the earth at the time of the meeting with the swarm, and the common radius vector, v the true anomaly of this radius in the original orbit, and v_1 that in the derived orbit; representing the angle between this common radius vector and the tangent to the original orbit by β, and with any one on the derived orbit by β_1, he educed the following values for the elements of the three orbits, where m is the value of the velocity of commencement for one second of time:—

	Comet.	I.	II.	III.
T	1859·390 G.M.T.	1872·986	1885·983	1892·976
π	109° 50′·4	108° 55′·0	108° 45′·3	108° 59′·2
☊	246 1·3	—	—	—
i	12 22·0	—	—	—
log a	0·54950	0·55149	0·54833	0·55050
log e	9·87711	9·87788	9·87668	9·87750
log q	9·94123	9·94087	9·94138	9·94103
U	6·672	6·718	6·645	6·695
log R	—	9·99395	9·99397	9·99426
log r	—	9·94216	9·94156	9·94146
v	—	+ 5° 48′·0	– 3° 34·0	3° 3′·0
v_1	—	+ 6 43·4	– 2 28·9	– 3 54·2
β	—	87 30·5	91 32·0	88 41·4
β_1	—	87 6·5	91 4·2	88 19·3
I	—	– 0·0099	– 0·0116	– 0·0095
m	—	292m.	342m.	279m.

COMET HOLMES (1892 III.).—M. Schulhof's ephemeris for this comet gives for the ensuing week:—

12h. Paris Mean Time.

1893.		R.A. (app.) h. m. s.		Decl. (app.) ° ′ ″
March 23	...	3 8 3·8	...	+35 47 40
24	...	9 52·5	...	50 28
25	...	11 41·4	...	53 16
26	...	13 30·5	...	56 3
27	...	15 19·8	...	35 58 49
28	...	17 9·3	...	36 1 34
29	...	18 58·9	...	4 10
30	...	3 20 48·7	...	36 7 2

PROF. HALE'S SOLAR PHOTOGRAPHS.—Among the latest advancements in obtaining photographs of the sun, including simultaneously the chromosphere, faculæ, spots, &c., Prof. Hale has distinguished himself especially in this direction. With regard to the method which he adopts, M. Janssen communicates to the *Comptes Rendus* for March 6 (No. 10) a few words. I ask the Academy, he says, "la permission de lui faire remarquer que le principe de cette seconde fente a été très nettement indiqué par nous dans les Communications faites à l'Académie en 1869, et, avec plus de détails, dans une Communication faite au Congrès de l'Association britannique tenu à Exeter la même année."

GEOGRAPHICAL NOTES.

THE recognition accorded to geography in the University of Cambridge is not confined to the lectureship. The subject of the English essay proposed for competition this year by members of the University is announced as "The influence exercised upon British literature by the geographical features of the country." Probably "conditions" would convey the meaning better than "features," but apart from such detail, the subject is one likely to turn the attention of competitors to a much neglected matter—the geography of their own country.

THE survey of Greece is being actively carried on by the Austrian Government surveyors, who undertook the work in 1889. The primary triangulation is already completed, and while filling in the topographical details of the provinces of Thessaly and Albania the survey officers will be accompanied